

**ADDIS ABABA UNIVERSITY  
COLLEGE OF HEALTH SCIENCES  
DEPARTMENT OF MEDICAL LABORATORY SCIENCE**



**Prevalence of Intestinal Parasites, Associated Factors and Parental Knowledge, Attitude and Practices among Under Five Years old Children with Diarrhea at Federal Police Hospital, Addis Ababa, Ethiopia**

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**School of Graduate Studies**

This is to certify that the thesis prepared by Tesfaye Taye entitled "*Prevalence of intestinal parasites, associated factors and parental knowledge, attitude and practices among under five years old children with diarrhea at Federal Police Hospital, Addis Ababa ,Ethiopia*" submitted in partial fulfillment of the requirements for the Degree of Masters of Sciences in Clinical Laboratory Sciences (diagnostic and public health microbiology) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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## **Abbreviations**

|      |  |
|------|--|
| CI   | Confidence Intervals                   |
| ETB  | Ethiopian Birr                         |
| IPIs | Intestinal Parasite Infections         |
| KAP  | Knowledge, Attitude and Practice       |
| MNN  | Modified Ziehl-Neelsen                 |
| OR   | Odds Ratio                             |
| PI   | Principal Investigators                |
| Spp  | Species                                |
| SPSS | Statistical Package for Social Science |
| WHO  | World Health Organization              |

## Abstract

**Background:** Intestinal parasites are one of the most neglected and major public health problems particularly among under five children who have diarrhea in developing countries like Ethiopia. However, few Studies have been conducted in Ethiopia on prevalent intestinal, associated factors and Parental KAPs among under five children with diarrhea.

**Objectives:** To determine Prevalence of intestinal parasites associated factors and parental knowledge, attitude and practices among children who have diarrhea at Federal Police Hospital, Addis Ababa, Ethiopia.

**Methods:** This study was conducted from February, 2020 to October, 2020 at Federal police Hospital. Stool samples were collected with clean collection cup from 337 children suffering from Diarrhea. Soci-demographic data was obtained by interviewing each child's parents or guardians. Stool samples were collected from each study participant and examined by direct wet-mount microscopy, formalin-ether sedimentation and modified Ziehl Neelsen techniques. All data analysis was performed using SPSS. Binary logistic regression analysis with enter method calculating odds ratios (OR) and 95% confidence intervals. Statistical significance was set at P-value < 0.05. Data was summarized by using tables and graphs.

**Results:** Among the study participants, 147/337 (43.8%) intestinal parasitic infections were identified in federal police hospital, Ethiopia. The most frequent parasites encountered were, *E.histolytica/dispar*, *cryptosporidium* species and *G.lamblia*, 60(17.8%), 44(13.1%), and 16(4.7%) respectively. The prevalence was slightly higher among Females 44.3% (66/149) than males 41.1% (81/188). From 337 parent /guardian of child 96.4% had good knowledge while 15.7% of them had poor practices towards intestinal parasitosis. The risk factors include non-hand washing experience before meal, utilization of unwashed fruit and vegetable before consumption, Child contact with Animal and non-breast feeding status were significantly relationship with intestinal parasitic infections.

**Conclusion:** In the present study relatively high intestinal parasitic infection was observed among children attending at Federal Police Hospital, Addis Ababa, Ethiopia. From these parasites in which *E.histolytica/dispar*, *cryptosporidium* species and *Giardia lamblia* were the most common parasites. Majority of the participant guardians had good knowledge and positive attitude towards intestinal parasites. Thus, identified risk factors have to be considering public Health education about the way of transmission and prevention methods of intestinal Parasitosis.

**Key words:** intestinal protozoa, risk factors, diarrhea and children

# 1. Introduction

## 1.1 Background

A Parasite is an organism that lives on or within the host organism and which is physically or physiologically dependent upon other [1].

Intestinal parasites primarily infect the gastrointestinal tract (GIT) but can live throughout the body. Helminthes and protozoa are the two main types of intestinal parasites that live in the intestines [2]. Infections of humans caused by parasites number in the billions and range from relatively innocuous to fatal. The diseases caused by these parasites constitute major human health problems throughout the world [1].

The protozoan parasites are the more common cause of gastrointestinal disorders compared to helminthes especially in developing countries. A number of intestinal protozoan parasites are reported in different parts of the world like *Giardi lamblia*, *Dientamoeba fragilis*, *Entamoeba histolytica*, *Blastocystis homini*, *Isospora belli*, *Cyclospora cayetanensis* and *Microsporidia*. Among them *Entamoeba histolytica*, *Giardia lamblia*, and *Cryptosporidium* species are the most protozoan parasites of global public health concern. These organisms are common causes of diarrhea in children. Asymptomatic infection is also common in this population [3].

According to the World Health Organization (WHO), diarrhea is defined as having loose or watery stools at least three times per day, or more frequently than normal for an individual. It is usually a symptom of an intestinal tract, which has a variety of causative agents including viruses, bacteria and parasites. There are three clinical types of diarrhea: (i) acute watery diarrhea which lasts several hours up to 14 days and includes cholera and bloody diarrhea, also called dysentery; and (iii) chronic (persistent) diarrhea that lasts 14 days or longer. Infectious diarrhea remains a major cause of morbidity and mortality worldwide. They have their major impact in the developing world and are still responsible for the deaths of almost one million under five children each year. [4].

Environmental sanitation, personal hygiene, water treatment, economical status, sex, age, parental knowledge, chronic diseases, contact of domestic animals and immune-compromised individuals are the risk factors of parasitic infection [5, 6].

The transmission of some helminthes, protozoa and microsporidia to humans is via the fecal-oral route and can occur through direct contact with infected persons or animals (zoonotic transmission), or by ingestion of contaminated food (food borne transmission) or water (waterborne transmission). They are also easily transmitted by eating raw or undercooked foods [6].

To minimize mortality and morbidity under five children should assess knowledge, attitude and practice of parent /guardians of children toward intestinal parasite, prevalence of intestinal parasite and determine associated factors because these are useful for planning and performing successful community-based control interventions [7].

## 1.2 Statement of the Problem

Protozoan infections such as (*Ameobiasis*, *Giardiasis* and *Cryptosporidiosis*) and helminthic infections such as (*Ascariasis*, *Enterobiasis*, hookworms, and *Trichuriasis*) are among the most common intestinal parasitic infection in the worldwide. It is approximated that 3.5 billion people around the world are affected as a result of these infections, the majority being children[8]. These organisms are also known as serious public health problems in children and complications such as iron deficiency (anemia), vitamin A deficiency, diarrheal or dysentery, malnutrition, delay growth, physical and mental health problems. Moreover, IPIs can result in serious problems in gastrointestinal disorders patients [9].

Parasitic infections commonly found undeveloped countries of the tropical and subtropical regions because of high population density, poor environmental sanitation conditions, poor public health practices, poor hygiene food and water, malnutrition, low host resistance and climate change in tropical and subtropical countries [10].

Cases of intestinal parasitic are highly abundant in Ethiopia. Inadequate knowledge, attitude/perception and improper practice in relation to intestinal parasitic contribute to the high level of prevalence. Moreover, if peoples do not have adequate knowledge, attitude and practice regarding the disease it is difficult to control or to eradicate [11].

Researches findings showed intestinal parasitic major public health problems especially under five children who have diarrhea in developing countries like Ethiopia. But, few researches have been conducted in current study area. Why this study was intended to assess the prevalence of intestinal parasitic infections and KAP and associated factors among under five children with diarrhea at Federal Police Hospital [12].

### **1.3 Significant of study**

The study will provide update information about the prevalence of intestinal parasite infections, KAP and associated risk factor in diarrhea children on study area and study participant. It can use as a reference further in-depth epidemiological study for the researcher.

This study will increase awareness clinicians and other health professionals about intestinal parasite. Moreover, the present research additional data to policy maker and other concerned bodies.

## 2. Literature Review

Cross-sectional study was carried out in Baghdad-Iraqi the year of 2014. A total number of 2033 children with diarrhea were included in the study. The estimated prevalence rate of parasitic diarrhea was 22%. They identified the following major diarrhea cause were large household's size, residential location, water source, low socioeconomic status, and low parent education. *Giardia lamblia* was found to be the most prevalent parasite with an infection rate of 45.54% followed by *Entamoeba histolytica* 23.44%, *Enterobius vermicularis* 12.7%, *Hymenolepis nana* 9.82%, *Trichuris trichiura* 5.4%, and *Ascaris lumbricoides* 2.2% [13].

Research was conducted in India by Patel in 2013. Total 298 children up to the age of 12 years except neonates enrolled. Parasites were isolated by light microscope with direct saline smear, lugol's iodine solution and confirmed by formalin ethyl acetate concentration method. From 298 children 8.7% intestinal parasites reported among admitted children. The Most prevalent parasite was *Giardia Intestinalis* (5.4%) followed by *Ascaris lumbricoids* (1.3%). Lower economic status, longer duration and frequency of diarrhea, non-accessible of toilet facility and presence of dehydration were cause of parasitic infection in this study [14].

A cross-sectional study was conducted in Malaysia, 2017. A total of 136 parents of school children were selected randomly. No significant difference was observed between KAP Parents with intestinal parasite infection, low and high income among parents. [15].

Research was done in 2015 by Ngosso in Tanzania. Parasitic protozoa were investigated by standard microscopy and PCR methods. Total 720 children under-five years with diarrhea were analyzed. The most common protozoa were *Giardia lamblia* 35.6 %, followed by *Entamoeba histolytica* 12.2%, *Cryptosporidium parvum* 7.8 %, and Helminthes 12.7%. The study was identified Poor diet and unsafe water supply in households contributes to the prevalence of diarrhea [16].

A cross-sectional parasitological survey was conducted in Rwanda by Eric Butera in 2019. Fresh stool samples were collected from 353 less than two years children and examined using microscopy to detect parasite. From 335 children approximately one in two children (44.8%) was infected with intestinal parasite. The highest prevalent infection was *Ascaris* (28.5%) followed by *Entamoeba histolytica* (25.95%) and *Giardia lamblia* (19.6%). Children from households with access to treated drinking water were less likely to contract intestinal parasite infections compared with those who used untreated water [17].

Cross sectional study was carried out in Western Uganda by Ntulume in 2017. Two hundred children whose age less than twelve enrolled, from this study total of 73 (36.5%) was intestinal protozoan infections. The prevalence of *Giardia lamblia* was (16%), *Entamoeba histolytica/dispar* (13%) *Cryptosporidium* spp (4%) and *Cyclospora* spp (3.5%). The highest prevalence was in the age group 1-4 years, the reasons of prevalence of intestinal parasite in this study were mothers with no formal education and those with primary level education [18].

Cross sectional Research was conducted in Asmara by Khawaja Shakeel Ahmed. Total 126 stool samples were analyzed by formol-ether concentration technique. From 126 students 46 (36.50%) were infected by intestinal parasites. *Hymenolepis nana* was the highest prevalence rate 35 (76.0%) and out of 126 students 96 (76.1%) were having poor knowledge about the way of transmission of intestinal parasites [19].

Cross sectional study was conducted by Mulatu in Hawassa Ethiopia. A total of 158 children less than five years of age with diarrhea (51.3 % male and 48.7 % female) participated in the study. Total prevalence of IPs was 42/158 (26.6%) *Entamoeba histolytica/dispar/moshkovskii* was the most prevalent parasite (11.4 %) next this *Giardia duodenalis* (7.0 %) [20].

Cross sectional Research was conducted Woreta Health Center northwest Ethiopia in 2015. Study was conducted among less than five 310 children study. The prevalence of intestinal parasites was 18.7%. Due to Children who rarely feed fresh meal, nails were sometimes trimmed, had no clean playing ground and open defecation were occurrence intestinal parasitic infection this study. From the intestinal parasites, 53.5% were *G. lamblia* and 36.2% were *E. histolytica/E. dispar/E. moshkovskii*. [21].

Research was conducted by Gebretsadik at Dessie Referral Hospital in 2018. Out of 232 under five children 36 (15.5%) were infected with intestinal parasites. From this study five intestinal parasites were identified. Out of five intestinal parasite the most frequented Parasite was *E. histolytica* 15/232 (6.5%) next this *H. nana* 11/232 (4.7%) [22].

Research was carried out in Bahir Dar by Mohammed in 2016. Direct saline, Formalin-Ether concentration, and modified Ziehl-Neelson staining methods were used for identification for parasite. Prevalence of *Entamoeba histolytica/dispar* was 64/422 (15.2%), *Cryptosporidium* spp., and *Giardia Intestinalis* were detected as single infections in 16 (3.8%), and four (0.9%) of the study subjects, respectively [23].

Case control Research was conducted at Addis Ababa Hospitals in 2004. From 222 under five children, 61 (27.5%) were infected with of intestinal parasite. From Intestinal parasites isolated were *Cryptosporidium parvum* (8.1%), *Isospora belli* (2.3%), *Enterocytozoon bieneusi*/*Encephalitozoon intestinalis* (0.5%), *Ascaris lumbricoides* (0.5%), *Trichuris trichiura* (0.9%), *Giardia lamblia* (6.3%), *Entamoeba histolytica/ E. dispar* (1.4%), *Blastocystis hominis* (5.9%) and *Hymenolepis nana* (0.5%) [8].

### **3. Objective**

#### **3.1 General Objectives**

- ✓ To assess Prevalence of intestinal parasites associated factors and parental knowledge, attitude and practices among under five years old children who have diarrhea at Federal Police Hospital, Addis Ababa, Ethiopia from February, 2020 to October, 2020.

#### **3.2 Specific Objectives**

- ✓ To determine the prevalence of intestinal Parasites among under five years old children who have diarrhea at Federal Police Hospital, Addis Ababa, Ethiopia.
- ✓ To assess factors associated with intestinal parasite among under five years old children who have diarrhea at Federal Police Hospital, Addis Ababa, Ethiopia.
- ✓ To assess KAP of mothers'/caregivers' of under five children years old towards intestinal parasitic infection at Federal Police Hospital, Addis Ababa, Ethiopia.

## **4. Material and method**

### **4.1 Study Area**

The study was conducted at the Federal Police Hospital, Addis Ababa, Ethiopia. The hospital was established in 1955, E.C., located in Lideta sub-city. It provides medical service to all federal and regional police members & family, prisoners, civil customers (private wing). It provides service approximately for 450-500 patients per day. The Federal Police Hospital has 250 beds and 338 health's professional.

### **4.2 Study Design and Study Period**

Cross-sectional study was conducted from February, 2020 to October, 2020

### **4.3 Populations**

#### **4.3.1 Source population**

All under five years of age children who were attending at Federal police Hospital, Addis Ababa, Ethiopia

#### **4.3.2 Study population**

Children under five years of old attending at Federal Police Hospital, who fully filled the inclusion criteria

### **4.4 Eligibility criteria**

#### **4.4.1 Inclusion criteria**

Under five years of age children with complaint of diarrhea

Children who had sufficient stool

Parents/guardians who agreed to give information about their children

#### **4.4.2 Exclusion criteria**

-Under five children with diarrhea case and took anti parasites drugs in the last six days

#### **4.5 study Variables**

##### **4.5.1 Dependent Variables**

The dependent variable of the study was the occurrence intestinal parasite

##### **4.5.2 Independent Variables**

Independent variables included socioeconomic and demographic characteristics such as Income of a family, sex of child and age of child. Environmental factors were the availability and utilization of a latrine, and types of water source. Behavioral factors included patterns of hand-washing at critical times, water treatment, breast feeding status, contact with animals, unwashed fruit and vegetable and KAPs of parents/guardians.

#### **4.6 measurement and Data Collection**

##### **4.6.1 Sample Size Calculation and Sampling Method**

The sample size (n) was calculated using single population proportion sample size determination technique.

$$n = Z^2 P (1-P) / d^2$$

Where, n=the minimum sample size required, Z=-standard score corresponds to 1.96 at 95% confidence interval, d=is margin of sampling error tolerated(5% marginal error was used), p=prevalence of intestinal parasite=27.5% [8] was considered for the calculation of sample size and a sample size of 306 was obtained. To minimize errors from the likelihood of non-compliance, 10% of the sample size was added and a final sample size of 337.

**Sampling methods** -Convenient sampling methods was used until the sample size was reached.

##### **4.6.2 Data Collection Procedure**

Written consent was obtained from the parents /guardians of each child. The objectives as well as the nature of the study was explain to the parents and study participants .Data wasobtained by interviewing each child’s parents or guardians.During interview child’s parents were use Amharic language.Data was collected byprincipal investigators.

#### **4.6.3 Laboratory method.**

Single fecal sample from each child wascollected with proof and tightly cupped and clean cup. All stool samples were labeled with children’sidentification number whichgiven in the sequence oftheir registration during treatment, and then the results was combine with demographic information of children’such as age and sex. Identification of parasites wasbasedon the morphology of trophozoites, cysts, Oocysts, larva and ova (diagnostic stages). Each specimen was done bydirect saline wet-mount, formol-ether concentration andalso was stained by modified Ziehl-Neelsen (MZN) to detect theOocytes of *Cryptosporidium*spp [24].

##### **4.6.3.1 Macroscopic Examination**

Stool specimen was examined with macroscopic for presence of worms, consistency andcolour.

##### **4.6.3.2 Microscopic Examination**

The detection and identification of species of parasites require microscopic examination of specimens.

##### **4.6.3.3 Direct Microscopic**

Routine microscopic examination of stool specimen with physiological saline Lugol’s iodine solution helps to detect and identify the stages of some parasitic organisms. Saline wet mounts was made by mixing a small volume of stool with a drop of physiological, then saline on a glass microscope slide and placing a coverslip over the mixture for identifications of ova, cyst, larva and trophozoites .Iodine wet mounts was prepared by adding a small volume of stool to a drop of Lugol’s iodine on a glass microscope slideand placing a coverslip on the mixture. This used for identification cyst in detailed [25].

##### **4.6.3.4Formal-EtherConcentrationMethod**

Fresh faecal specimen was emulsified by mixing about 1g of stool with 7 mL of 10% formalin and was waited for 10- 30 minutes for fixation, then strained through gauze. The filtrate was added to 3 mL of Ether and then centrifuge at 1500rpm for 5 minutes and allowed to settle. The supernatant was removed and two drops of the sediments on a slide covered with a cover slip then was examined under 40X for parasite detection. This method used for confirming finding ova, cyst and larvae that not able to be seen by direct microscopy [26].

#### **4.6.3.5 Modified Zeihl-Neelsen Method**

For detection of oocysts of opportunistic coccidial intestinal parasite-*Cryptosporidium* species, *Isospora belli* and *Cyclospora cayetanensis* modified ZN staining run accordingly. First, Fresh and non-contaminated faecal samples were collected, and then appropriate thin smears were prepared, and air-dried. The air dried stool samples were fixed with methanol for 5 minutes and stained with strong carbon fuchsin for 15-20 minutes. The slides were decolorized in 1% HCl acid-alcohol for 1 minute and counter stained with 1% methylene blue and left for 1 minute. Finally, the stained smears were dried and examined microscopically using higher magnification (100X) [27].

#### **4.7 Data Quality Assurance**

A properly designed questionnaire was used. Double data entry was used to ensure data quality. Data Quality Assurance all laboratory analyses were carried out using standard operating procedures

Pre-analytical: Adequate stool specimen or 5 gm. stool was collected using carefully labeled, dry, leak proof, grease free transparent stool caps. The specimen was kept free of contamination from water, soil, and urine. Specimens contaminated with water, urine and soil were rejected.

Analytical: Direct stool examination was performed within 30 minutes of collection and appropriate amount of stool sample was used to make a good smear devoid of air bubbles. After checked the contrast using 10X objective, the ova, larva, cyst and trophozoites of helminthes and protozoa were diagnosed by 40X objective. Each stool smears were examined for at least 10-30 minutes. Positive and negative controls were used to check the quality of reagent.

Post-analytical: All microscopic findings were coded and reported appropriately.

#### **4.8 Data Analysis and Interpretation**

Quantitative data were entered into a predrafted coding sheet in to SPSS. Descriptive statistics analysis was performed using SPSS. Binary logistic regression analysis with enter method calculating odds ratios (OR) and 95% confidence intervals (CI) was used to estimate the association between the dependent and independent variables. Statistical significance was set at  $P\text{-value} < 0.05$ . Data was summarized using frequency tables and bar charts. 50% as a cut-off value was used to assess good/poor KAP of parents/guardians of children towards intestinal parasitic infection [28].

#### **4.9 Ethical considerations**

Ethical clearance was given from the department of Medical Laboratory Sciences, Addis Ababa University. An Official Letter was written from the University to the Federal Police Hospital administrator and the Hospital granted permission for study was conducted. Written consent was obtained from the guardians of each child. The objectives as well as the nature of the study were explained to the parents and study participants. Children positive for intestinal parasites were treated at the hospital according to national guidelines.

#### **4.10 Operational Definition**

**Children**- a child whose age less than five years old

**Diarrhea**- defined as having loose or watery stools at least three times per day, or more frequently than normal for an individual.

**Good knowledge**: individuals who answered  $\geq 50\%$  of the knowledge questions.

**Poor knowledge**: individuals who answered  $< 50\%$  of the knowledge questions.

**Positive attitude**: individuals who answered  $\geq 50\%$  of the attitude questions.

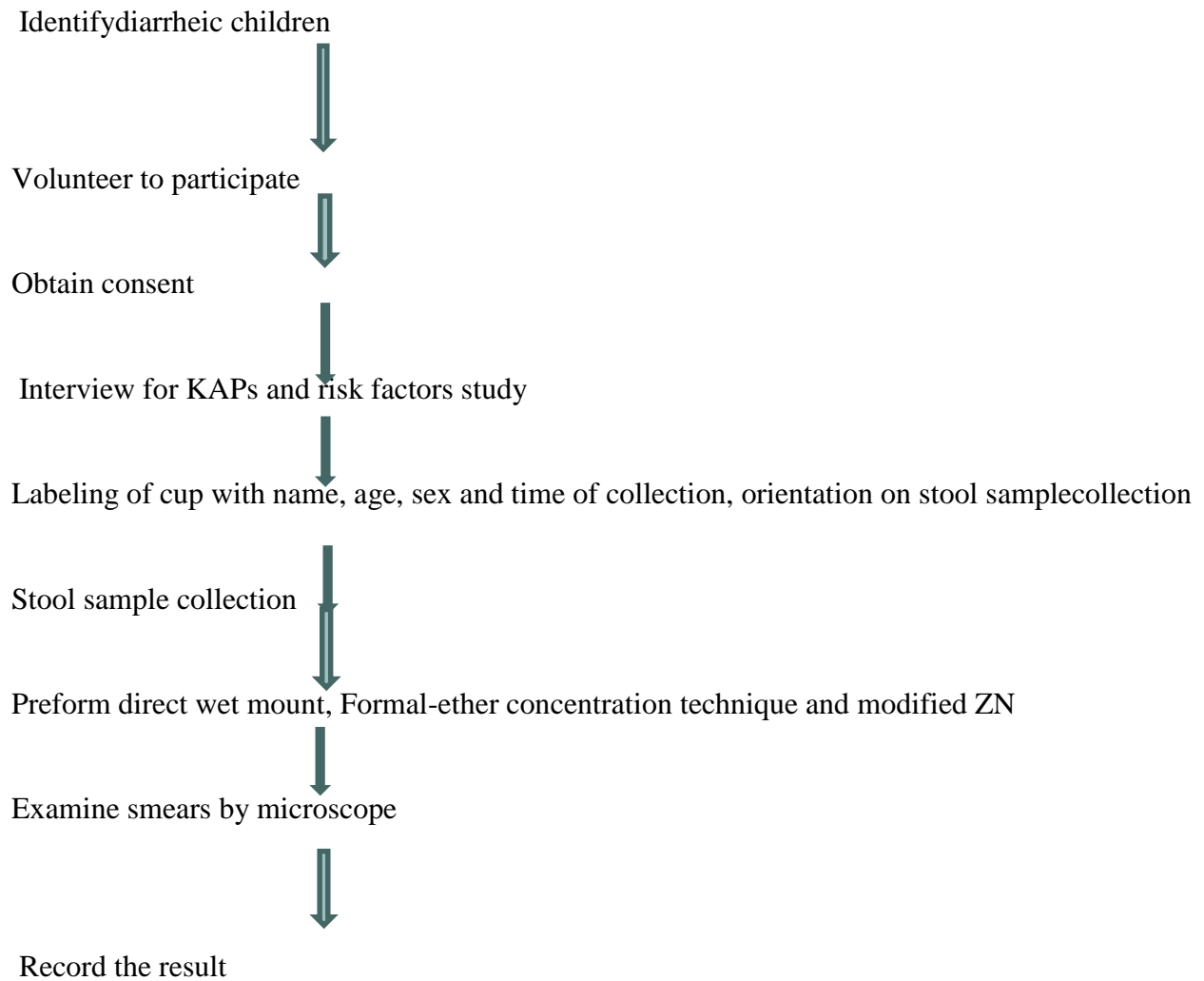
**Negative attitude**: individuals who answered  $< 50\%$  of the attitude questions.

**Good practice**: individuals who answered  $\geq 50\%$  of the practice questions.

**Bad practice**: individuals who answered  $< 50\%$  of the practice questions [11].

## 5. Work flow

The study was conducted as follows:



**Figure 1 work flow**

## 6 Results

### 6.1. Socio-demographic characteristics and clinical information of participants

A total of 337 Children who had diarrhea with age range of one day to 5 years and each child's parents were included in this study. From 337 of study participants, 188/337(55.8%) were males and the rest 149/337 (44.2%) were females'. 202/337 (60.0%) children fall within the age category of one day to 2 years. From study participants, 232/337 (68.8%) were Non schooling while the remaining 105/337(31%) were kinder grader students. Out of 337 child's parents whose income where 4000-600 birr where 169/337(50.1 %), > 6000 were 128/337(37.9 %) and <4000 were 40/337 (11.9 %). Most study participant 300/337(89%) had acute diarrhea and the remaining chronic diarrhea 37/337(11%). (Table 1)

**Table 1 Socio-demographic data and clinical information of participants at Federal police hospital, Addis Ababa, Ethiopian (n=337), 2020**

| Variables            | Category      | No. of study participants | Percent (%) |
|----------------------|---------------|---------------------------|-------------|
| Sex                  | Male          | 188                       | 55.8        |
|                      | female        | 149                       | 44.2        |
| Age                  | <12 month     | 65                        | 19.3        |
|                      | 12-24 month   | 137                       | 40.7        |
|                      | 25-60 month   | 135                       | 40.1        |
| Educational status   | Non schooling | 232                       | 68.8        |
|                      | kinder garden | 105                       | 31.0        |
| Family income        | <4000         | 40                        | 11.9        |
|                      | 4000-6000     | 169                       | 50.1        |
|                      | >6000         | 128                       | 37.9        |
| Duration diarrhea of | Acute         | 300                       | 89          |
|                      | Chronic       | 37                        | 11          |
| Chronic disease      | Yes           | 7                         | 2.1         |
|                      | No            | 330                       | 97.1        |

## 6.2. Prevalence of intestinal parasites

The overall prevalence of intestinal parasites was 147/337(43.8%).A total of 20/337 (6%)co-infections were found.Co-infections showed *E.histolytca/dispar* with *H.nana*, *G. lamblia* and *cryptosporidium*. Five species intestinal parasites were identified and of them, *E.histolytca/dispar* was the most common intestinal parasite detected 60/337 (17.8%) followed by *cryptosporidium species*44/337(13.1%), *G.lambli*a16/337(4.7%),*A.lumbricoides* 4/337(1.2%) and *H.nana*3/337 (0.9%).

**Table 2 Distribution of intestinal parasite among under five years old children at Federal Police Hospital,Ethiopian (n=337), 2020**

| Parasite species  | Frequency | Percent |
|---|-----------|---------|
| <i>E. histolytca/E.dispar</i>                             | 60        | 17.8    |
| <i>G.lambli</i> a   | 16        | 4.7     |
| <i>A.lumbricoides</i>                                     | 4         | 1.2     |
| <i>H.nana</i>   | 3         | .9      |
| <i>cryptosporidium Spp</i>                                | 44        | 13.1    |
| <i>E.histlotica/dipar</i> and <i>H.nana</i>               | 2         | .6      |
| <i>E.histolytca/dispar</i> and <i>G.lambli</i> a          | 7         | 2.1     |
| <i>E.histolytca/dispar</i> and <i>cryptosporidium spp</i> | 10        | 3.0     |
| <i>H.nana</i> and <i>cryptosporidium</i>                  | 1         | .3      |
| Total   | 147       | 100.0   |

The overall intestinal parasite prevalence was slightly higher among females 66/149(44.3%) compared to males 81/188 (44.1%). The highest proportion of intestinal parasites showed among the age group of 25-60 months study subjects 78/135( 57.7%) followed by the age groups 12-24 months with infection rates of 58/137(42.3%) and children who age group 0-11 months 11/65 (28.4). Intestinal parasitic infection was significantly associated with age group of 12-24 months (p=0.002), 25-60 months (p=0.01) and 400-600 ETB family income (p=0.01) .On the other hand;

sex, Duration of diarrhea, chronic disease and educational status didn't significant relation (table3).

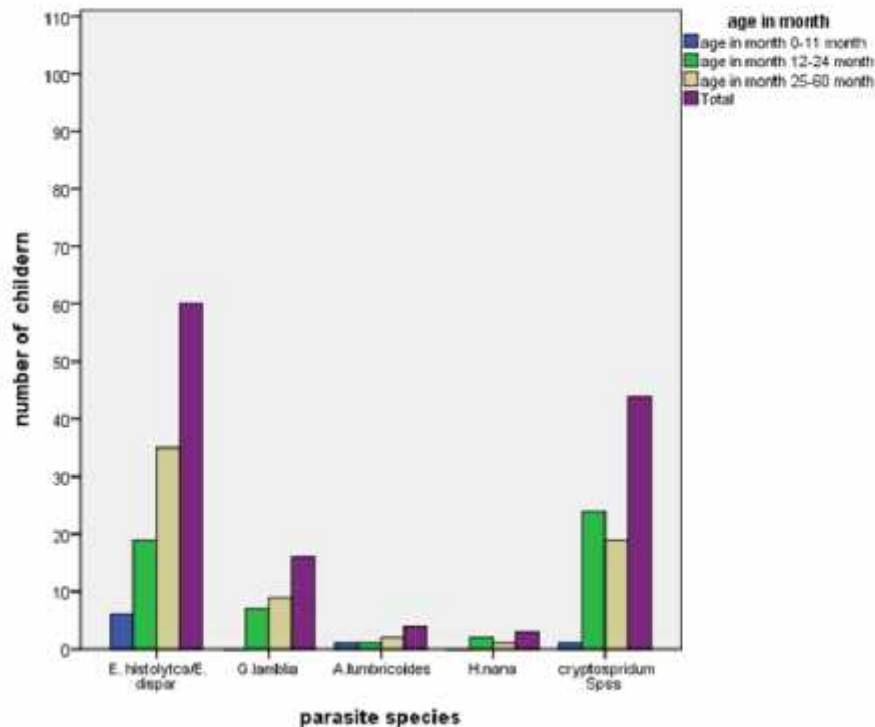
**Table 3: Distribution and association of intestinal parasites infection by socio demographic data at Federal Police Hospital, Ethiopia (n=337), 2020**

| Socio demographics           | Total | % of positive intestinal parasite | COR 95%             | P-value | AOR 95%             | p-value |
|------------------------------|-------|-----------------------------------|---------------------|---------|---------------------|---------|
| <b>Sex</b>                   |       |                                   |                     |         |                     |         |
| <b>male</b>                  | 188   | 81(43.1%)                         | 0.973(0.762-1.241)  | 0.84    |                     |         |
| <b>female</b>                | 149   | 66(44.3% )                        | 1                   | 1       |                     |         |
| <b>Age group</b>             |       |                                   |                     |         |                     |         |
| <b>0-11 month</b>            | 65    | 11(16.9 %)                        | 1                   | 1       | 3.350(1.582-7.093)  | 0.002   |
| <b>12-24 month</b>           | 137   | 58(42.3 %)                        | 3.604(1.734-7.491)  | 0.001*  | 5.928(2.755-12.756) | 0.01    |
| <b>25-60 month</b>           | 135   | 78(57.7%)                         | 6.718(3.228-13.979) | 0.01*   |                     |         |
| <b>Educational status</b>    |       |                                   |                     |         |                     |         |
| <b>Non schooling</b>         | 232   | 88(37.9)                          | 0.476(0.298-0.71)   | 0.002*  | 0.970(0.450-2.090)  | 0.938   |
| <b>KG</b>                    | 105   | 59(45.8)                          | 1                   |         |                     |         |
| <b>Family income</b>         |       |                                   |                     |         |                     |         |
| <b>&lt;4000</b>              | 40    | 15(37.5%)                         | 1.476(0.700-3.10)   | 0.36    | 3.139(1.866-5.2779) | 0.01*   |
| <b>4000-6000</b>             | 169   | 89(52.70)                         | 2.736(1.681-4.453)  | 0.01*   |                     |         |
| <b>&gt;6000</b>              | 128   | 37(28.9)                          | 1                   | 1       |                     |         |
| <b>Duration of diarrhea.</b> |       |                                   |                     |         |                     |         |
| <b>Acute</b>                 | 300   | 121(40.3)                         | 0.57(0.289-1.142)   | 0.114   |                     |         |
| <b>chronic</b>               | 37    | 20(55.6)                          | 1                   |         |                     |         |
| <b>Chronic disease</b>       |       |                                   |                     |         |                     |         |
| <b>Yes</b>                   | 7     | 4(57.1%)                          | 1.744(0.384-7.914)  | 0.471   |                     |         |
| <b>No</b>                    | 330   | 143(43.3)                         | 1                   |         |                     |         |

The Prevalence of *E. histolytica*/*E. dispar* among children within age group 25-60 month was higher than age group <12 month and 12-24 month. *Cryptosporidium* Sapp among age group 12-24 showed highest followed by the age group 25-60 and <12 months (Table 4).

**Table.4 Prevalence of intestinal parasitic infections among different age group at Federal police hospital, Ethiopia (n=337), 2020**

| Name of parasite species                                    | Age in month       |                |                | Total |
|---|--------------------|----------------|----------------|-------|
|   | <12 months<br>n=65 | 12-24<br>N=137 | 25-60<br>N=135 |       |
| <i>E. histolytica/E. dispar</i>                             | 6(10)              | 19(31.7)       | 35(58.3)       | 60    |
| <i>G. lamblia</i>   | 0(0)               | 7(43.8)        | 9(56.3)        | 16    |
| <i>A. lumbricoides</i>                                      | 1(25)              | 1(25)          | 2(50)          | 4     |
| <i>H. nana</i>  | 0(0)               | 2(66.7)        | 1(33.7)        | 3     |
| <i>Cryptosporidium</i> Spss                                 | 1(2.3)             | 24(54.5)       | 29(43.2)       | 44    |
| <i>E. histolytica/dispar</i> and <i>G. lamblia</i>          | 1(14.3)            | 1(14.3)        | 5(71.4)        | 7     |
| <i>E. histolytica/dispar</i> and <i>H. nana</i>             | 0(0)               | 0(0)           | 2(100)         | 2     |
| <i>E. histolytica/dispar</i> and <i>cryptosporidium</i> Spp | 2(20)              | 4(40)          | 4(40)          | 10    |
| <i>H. nana</i> and <i>cryptosporidium</i>                   | 0(0)               | 0(0)           | 1(100)         | 1     |



**Figure 2 Distribution of intestinal parasitic infections among different age group at Federal Police Hospital, Ethiopia (n=337), 2020**

### 6.3 Risk Factors Associated With Intestinal parasitic infections

The risk factors including non-handwashing experience before meal ( $p < 0.01$ ), unwashed fruit and vegetable before consumption ( $p = 0.014$ ), Child contact with Animal ( $p = 0.026$ ) and non-Breast feeding status ( $p = 0.16$ ) were significantly associated with intestinal parasitic infections but use of Latrine, source of drinking water and Chronic disease no significantly ( $p > 0.05$ ) associated with intestinal parasitic infections (Table 5).

**Table 5 Association between risk factors and the prevalence of intestinal parasitic infections at Federal Police Hospital, Ethiopia (n=337), 2020**

| Risk factory | Total | No positive % | COR 95% | p-value | AOR95% | p-value |
|--------------|-------|---------------|---------|---------|--------|---------|
|--------------|-------|---------------|---------|---------|--------|---------|

|   |     |           |                     |        |                    |        |
|---|-----|-----------|---------------------|--------|--------------------|--------|
| <b>Drinking water source</b>                          | 215 | 118(54.8) | 2.676(0.899-7.966)  | 0.077  |                    |        |
| <b>Tap water</b>                                      | 106 | 24(22.6)  | 0.644(0.204-2.035)  | 0.453  |                    |        |
| <b>Filtered water</b>                                 | 16  | 5(31.3)   | 1                   | 1      |                    |        |
| <b>Tap &amp; filtered water</b>                       |     |           |                     |        |                    |        |
| <b>Latrine</b>  |     |           |                     |        |                    |        |
| <b>Yes</b>  | 323 | 138(42.7) | 1                   |        |                    |        |
| <b>No</b>   | 14  | 9(64.3)   | 2.43(0.791-7.360)   | 0.122  |                    |        |
| <b>Hand washing before meal</b>                       |     |           |                     |        | 4.614(2.624-.113)  | <0.01* |
| <b>Yes</b>  | 250 | 83(33.2)  | 1                   |        |                    |        |
| <b>No</b>   | 87  | 64(73.6)  | 5.999(3.248-9.649)  | <0.01  |                    |        |
| <b>Washing fruit and vegetable before consumption</b> |     |           |                     |        |                    |        |
| <b>Yes</b>  | 184 | 64(34.8)  | 1                   | 1      | 1.824(1.133-2.941) | 0.014* |
| <b>NO</b>   | 153 | 83(54.2)  | 2.223(1.432-3.450)  | <0.01* |                    |        |
| <b>Child contact with Animal</b>                      |     |           |                     |        |                    |        |
| <b>Yes</b>  | 120 | 70(58.3)  | 2.545(1.611-4.0210) | <0.01* | 1.775(1.0732.938)  | 0.026* |
| <b>NO</b>   | 217 | 77(35.5)  | 1                   | 1      |                    |        |
| <b>Chronic disease</b>                                |     |           |                     |        |                    |        |
| <b>Yes</b>  | 7   | 4(57.1)   | 1.744(0.384-7.914)  | 0.471  |                    |        |
| <b>No</b>   | 330 | 143(43.3) | 1                   |        |                    |        |
| <b>Breast feeding status</b>                          |     |           |                     |        |                    |        |
| <b>Yes</b>  | 177 | 60(33.9)  | 1                   | 1      |                    |        |
| <b>No</b>   | 160 | 87(54.4)  | 2.324(1.497-3.609)  | <0.01* | 1.807(1.115-2.931) | 0.016* |

#### 6.4. Results of KAP parent/guardians towards intestinal Parasitosis

##### 6.4.1. Knowledge

From 337 parents/guardians 231 (68.5%) of the participants had prior knowledge about intestinal Parasitosis with 324/337 (96.1 %) of them mention how it is transmitted and 10/337(3%) having no idea about the preventive measures and 332/337(98.5%) of them seeking treatment from clinics/hospitals. Of the 337, 325(96.4%) had good knowledge about the way of Transmission, and prevention of intestinal parastosis while the remaining 12/337(3.6%) had poor knowledge. (Table 6)

**Table: 6. Knowledge of parents/guardians towards intestinal Parasitosisat Federal Police Hospital, Ethiopia (n=337), 2020**

| <b>Knowledge variables</b>                             | <b>Yes n (%)</b> | <b>No n (%)</b> | <b>Total</b> |
|--|------------------|-----------------|--------------|
| <b>Have you ever heard about intestinal parasites?</b> | 231(68.5)        | 106(31.5)       | 337          |
| <b>How did you know about intestinal parasites</b>     |                  |                 |              |
| <b>a. Radio</b>  | 65(19.3)         |                 |              |
| <b>b. Health facility</b>                              | 199(59.1)        |                 |              |
| <b>c. Friends</b>                                      | 16(4.8)          |                 |              |
| <b>How is intestinal parasites transmitted?</b>        |                  |                 |              |
| <b>Playing with soil</b>                               | 86(25.6)         | 251(74.6)       | 337          |

|  |           |           |     |
|--|-----------|-----------|-----|
| <b>B .Dirty water</b>  | 248(73.6) | 89(76.4)  | 337 |
| <b>c. Playing in infested river water</b>                              | 83(24.4)  | 254(25.6) | 337 |
| <b>D by files</b>  | 0(337)    | 337(100)  | 337 |
| <b>e. Eating contaminated food</b>                                     | 234(69.5) | 103(30.5) | 337 |
| <b>f. Don't know</b>   | 13(3.9)   | 324(96.1) | 337 |
| <b>What are the main signs and symptoms of intestinal parasites?</b>   |           |           |     |
| <b>a. Fever</b>  | 111(32.9) | 226(73.1) | 337 |
| <b>b. Headache</b>   | 32(9.5)   | 305(90.5) | 337 |
| <b>c. Weakness</b>   | 60(17.8)  | 277(82.2) | 337 |
| <b>d. Dry cough</b>  | 26(7.7)   | 311(92.3) | 337 |
| <b>e. Abdominal pain / discomfort</b>                                  | 208(61.7) | 129(38.3) | 337 |
| <b>f. Diarrhea</b>   | 169(50.1) | 168(49.9) | 337 |
| <b>g. Blood in stool</b>   | 46(13.6)  | 291(86.4) | 337 |
| <b>h. don't know</b>   | 6(1.8)    | 331(98.2) | 337 |
| <b>6. is intestinal parasites treatable?</b>                           | 330(97.9) | 7(2.1)    | 337 |
| <b>Where do you prefer to seek treatment for intestinal parasites?</b> |           |           |     |
| <b>a. Traditional healer</b>   | 1(0.3)    | 336(99.7) | 337 |
| <b>b. Health facility</b>  | 332(98.5) | 5(1.5)    | 337 |
| <b>c. pharmacy</b>   | 8(2.4)    | 329(97.6) | 337 |
| <b>is intestinal parasite a preventable disease?</b>                   | 337(100)  | 0(0)      | 337 |
| <b>How do you prevent intestinal parasites?</b>                        |           |           |     |
| <b>a. Treatment with specific medicines</b>                            | 109(32.3) | 228(77.7) | 337 |
| <b>b. Avoid bathing or swimming in stagnant</b>                        | 156(46.3) | 181(43.7) | 337 |
| <b>c. Use of toilets</b>   | 73(21.7)  | 264(78.3) | 337 |
| <b>d. Provision of safe tap water</b>                                  | 254(75.4) | 83(74.6)  | 337 |
| <b>e. No</b>   | 10(3.0)   | 327(97)   | 337 |
| <b>Overall Knowledge level</b>   |           |           |     |
| <b>Good knowledge</b>  | 325(96.4) |           |     |
| <b>Poor knowledge</b>  | 12(3.6)   | 33        |     |
| <b>Total</b>   | 337(100)  |           |     |

#### 6.4.2. Attitude

Of the 337,336(99.7%) considered intestinal parasitosis as a serious disease and 324/337(96.1%) of the respondents believed that playing on the soil can be a cause for intestinal parasitosis. Higher number of parent /guardians 318/337(94.4%) believed that eating raw vegetables can cause intestinal parasitosis. (Table 7)

**Table 7: Attitude of parents/guardians towards intestinal parasitosis at Federal Police Hospital, Ethiopia (n=337), 2020**

| Attitude variable  | Yes n (%) | No n (%) | Total |
|--|-----------|----------|-------|
| Do you think intestinal parasitosis is a serious disease?                      | 336(99.7) | 1(0.3)   | 337   |
| Do you think to take a medication against intestinal Parasitosis is important? | 305(90.5) | 32(9.5)  | 337   |

| Practice variable | Yes n (%) | No n (%) | Total n |
|-------------------|-----------|----------|---------|
|-------------------|-----------|----------|---------|

|  |            |           |     |
|--|------------|-----------|-----|
| Do you think going to health facility is important when you feel abdominal discomfort? | 327(97)    | 10(3)     | 337 |
| Do you think taking traditional medication is good to Treat intestinal parasitosis?    | 102(30.3)  | 235(69.7) | 337 |
| Do you think playing in soil can cause intestinal Parasitosis?                         | 324(96.1)  | 13(3.9)   | 337 |
| Do you think eating raw vegetables can cause Intestinal parasitosis?                   | 318(94.4)  | 19(5.6)   | 337 |
| positive attitude  | 337(100)   |           |     |
| Negative attitude  | 0(0)       |           |     |
| Total  | <b>337</b> |           |     |

### 6.4.3. Practices

Regarding respondents practices 191/337(56.7%) of the respondents had practices of eat raw meat/vegetable, 262/337(77.7 %)cut nails periodically,322/337(95.5 %) go to health facility when child feels abdominal discomfort and 259/337(76.9%) wash hand before meal. And also, 126/337(37.4 %) of respondents use filter water to drink

**Table 8: practice of parents/guardians towards intestinal parasitosis at Federal PoliceHospital, Ethiopia (n=337), 2020**

|   |            |           |     |
|---|------------|-----------|-----|
| <b>Do child eat raw meat/vegetable?</b>   | 146(43.30) | 191(56.7) | 337 |
| <b>Do child wash your hand before meal?</b>                                     | 259(76.9)  | 78(23.1)  | 337 |
| <b>Do you go to health facility when your child feels abdominal discomfort?</b> | 322(95.5)  | 15(4.5)   | 337 |
| <b>Do child take medications for intestinal parasitosis?</b>                    | 64(19)     | 273(81.0) | 337 |
| <b>Do child Cut nails periodically?</b>   | 262(77.7)  | 75(22.3)  | 337 |
| <b>Do you use filter water to drink?</b>  | 126(37.4)  | 211(62.6) | 337 |
| <b>Good practice</b>  | 284(84.3)  |           |     |
| <b>Bad practice</b>   | 53(15.7)   |           |     |
| <b>Good practice &amp; knowledge against intestinal parasite</b>                | 5(1.5)     |           |     |
| <b>bad practice &amp; knowledge against intestinal parasite</b>                 | 3(0.9)     |           |     |
| <b>Total</b>  | 337(100)   |           |     |

## 7. Discussion

The present study was aimed to assess prevalence and associated risk factors among children with diarrhea. It also assessed the KAP of parents at Federal Police Hospital. Our findings

147/337(43.8%)of study participants hadIntestinal parasites. This prevalence of intestinal parasitic infections in the present study was comparable with the study conducted by Eric Butera etal in Rwanda .From 335 children 44.8% was infected with minimum one intestinal parasite [17].

The finding of this study was higher than reports from in Baghdad-Iraq 22%, India 8.7%,Western Uganda 36.5%,Asmara 36.5 and different part of Ethiopia such as,Hawassa 26.6%,Woreta 18.7%, Dessie15.5%,Bahir Dara 20.4% and Addis Ababa 27.5% [13,14,18-22].However, it was a lower finding previous studies conducted in Tanzania[16]. The differences in findings among the studies can be explained by Variations in geography, study subjects, socioeconomic, hygienic conditions and method of Laboratory analysis

The most frequent intestinal parasite in the present study was *E. histolytic/E.dispar* 60/337(17.8%)that Showed agreement with findingstudy was conducted inHawassa, Dessie and Bahir Dar[20,22,23].In other hand, this result differs from other study findings conducted in Baghdad-Iraq,India,Western Uganda, Asmara, Addis Ababa, Tanzania and Rwand1 [13,14,18,19,8,16,17].This variation can be due to level sanitation and availability and access to safe drinking water of the study participants.

The frequency of *G.lambliia* in this study (4.7%), lower than research was conducted in Baghdad-Iraq,India, Tanzania,Rwanda,Western Uganda,Woreta health center northwest Ethiopia and Addis Ababa[13,14,16,17,18,21,8],but higher than study done in BahirDar and at Dessie Referral Hospital[23,22].

The prevalence of*cryptosporidium*Spp was in this study higher than research was conducted Western Uganda, Tanzania and Addis Ababa [18, 16, 8].But, it was lower finding previousstudies conducted Bahir dar [3].This variation might be due to variation immune status of the study participants.

The prevalence of *A.lumbricoides* in this study was 1.2% was comparable with the study conducted byIndia 1.5% [14] but lower than study was conducted in Addis Ababa 0.5% .This variations might be due to variations study sample size [8].

The overall intestinal parasite prevalence was slightly higher among females 66/149 (44.3%) compared to males 81/188(44.1%) but in this study prevalence of intestinal parasites infections and gender was no statistical significant. This finding similar with the finding of a previous study conducted in Western Uganda, Rwanda and Warta health center [18, 17, 21]

The rate of prevalence of intestinal parasitic infection was different among different age groups 0-11 month, 12-24 month and 25-60 month 11(28.4%), 58(42.3 %) and 78(57.7). The highest proportion of intestinal parasites showed among the age group 25-60 months study subjects 57.7%.(78/137). This happened when increase age among under five children have probability playing ground.

In the present study 96.4% of parents/guardians had good knowledge towards of intestinal parasitosis while the remaining 3.6% had poor knowledge. In current study, of 231 (68.5 %) of parents/guardians had prior knowledge. about intestinal parasitosis .This result was lower than from a result of a study conducted in Asmara in which 73 % of the respondents had heard about intestinal parasitosis but higher than study conducted in Malaysia in which 67.6% study participates had prior knowledge towards intestinal parasitosis. In present study 324/337(96.1%) of parents/guardians were able to mention at least one mode of transmission. This result higher than from a result of a study conducted in Asmara 15.8 %. and also this present study higher than study conducted in Malaysia in which 52.9% of study participates were able to mention at least one mode of transmission [19, 15] .

In the current study, 76.9% respondents observe washing hands of their children before eating. This report was lower than from a study conducted in Malaysia in which 93.4% of the study participants where observe washing hands of their children before eating[15].

In the current study, source of drinking water not significantly associated with intestinal parasitic infection this differ to study conducted in India, Bahir Dar and Tanzania. This differ could be economical variation of region to availability drinking water [14, 23, 16].

Present study reported not significant association of parasitic infection and availability Latrine. But the parasitic infection was in who among under five children no available latrine two times increase who among under five children available This finding was different from the study conducted in India, Bahir Dar, Asmara and Woreta Health center [14, 23, 19, 21].

In the current study, the parasitic infection was found higher in who among under five Children non breast feeding status 54.4% than who among under five Children breast feeding status 33.9 % with statistical significant associated. These indicate maternal breastfeeding is important to reduce occurrence intestinal parasite for under five children who have diarrhea.

In current study, the higher prevalence of parasitic infection among under five children consumption unwashed fruit and vegetable (54.2%) and statistical significant associated. This might be due to fruits and vegetable contact with soil.

In the current study, the parasitic infection was found higher in who among Children contact animal (58.3%) than who among Children non-contact animals (35.5%) with statistical significant associated. These might due to animals are source of intestinal parasite infection.

In current study, Because of lack resource did not isolate pathogenic *E. histolytic* from non-pathogenic *E. dispar*. In addition, did not identify bacterial and viral causes of diarrhea. This indicates further in- depth molecular and epidemiological studies should be made in the study area.

### **8 Limitation of the study**

- ✓ We did not perform molecular techniques (PCR).
- ✓ We did not isolate bacterial and viral causes of diarrhea

## **9. Conclusion and recommendation**

### **9.1. Conclusion**

High prevalence of intestinal parasitic infection was identified among children attend at federal police hospital, Ethiopia. From this parasites in which *E.histolytica/dispar*, *cryptosporidium* species and *Giardia lamblia* were the most common parasites. The parasitic infection among children who have diarrhea children was found closely related to contact with domestic animals, sanitary condition, non-breastfeeding status and other activities.

On the other hand, 96.4% parents/guardians had good knowledge and 100% positive attitude about intestinal parasitosis. 84.3% of parents/guardians had good practices towards intestinal parasitosis but they had also low practices like use filter water to drink.

## **9.2 Recommendation**

Based on the finding of the study, the following points were recommended. There is a need of:-

- ✓ Health education about the way of transmission and prevention methods of intestinal Parasitosis
- ✓ Boiling and filtering water for drinking could be a recommended method to reduce the existing increased prevalence of *Amoebiasis* and *Giardiasis*
- ✓ Moreover, further in-depth epidemiological studies should be made in the study area.

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## **11. Annex**

### **Annex I Participant information Sheet (English and Amharic version)**

#### **1. Purpose**

- To determine Prevalence of intestinal parasites associated factors and parental knowledge, attitude and practices among children who have diarrhea at federal police hospital.

#### **2. Procedure to be carried out**

- Collection of stool sample for your children
- There is no risk or discomfort during collection of stool sample

#### **3. Expected benefit of the study**

- The individual can be diagnosed for intestinal parasites the study gives information for about intestinal protozoa in diarrhea children to improving preventive and control strategies for the wellbeing of the children particularly relating to intestinal parasitic infections.
- The assessed information about the prevalence of intestinal parasite, parental KAPs and associated factors among children will be used as additional information data for government policy makers.

#### **4. Confidentiality of your information**

- Records will be kept confidential.
- Your name will not be mentioned.
- Your specimens will use only for the purpose this study.

#### **5. Voluntary participation**

- The participation to the study is based on your willingness.
- The participant can be with draw himself from the study at any time and cannot be asked by the researcher.
- With drawl from the study does not have any impact in the participants' right of getting the health service?

#### **6. Contact address**

Investigator – Tesfaye Taye

Email – tesfayetaye59@yahoo.com

Mobile- +251 913525746

ማውጫ

**ለተሳታፊዎች መረጃ ቅጽ (በአማርኛ)**

➢ የጥናቱ አላማ በፖሊስ ሆስፒታል ባለ-ህድሜቸው ከ5 ሀመት በታች ህጻናት ከሚያስቀምጣቸው የሆድ-ስጥት ላትል በሽታ ለማወቅ

**2. የሚካሄደው ድርጊት**

- የሰገራና ሙናሰጣሉ
- ሰገራ በሚሰጥበት ጊዜ ምንም ጉዳት የለውም

**3. የጥናቱ ጥቅም**

- በተሳትፎዎች የዚህ በሽታ ተጠቂ መሆን ወይም አለመሆን ያየው ቃሉ
- ለሁሉ ፓታል አስፈላጊውን መርጃ ለመስጠትና ለመንግስት ፖሊሲ አውጪዎች መርጃ እንዲሆን

**4. ሚስጥራዊነት**

- ውጤቱ በሚስጥር ይቀመጣል
- ስምዎት አይጠቀስም
- የሚሰጡትና ሙና ለዚህ ጥናት ብቻ የሚውል ነው

**5. በፍቃደኝነት ስለመሳተፍ**

- ተሳታፊነትዎ በእርሶፍ ላይ የተመሰረተ ነው
- በማንኛውም ሰዓት ከጥናቱ የማቋረጥ መብት አለዎት ምክንያቶችን አይጠየቁም
- አለመሳተፍዎ በሌላ የጤና አገልግሎት ላይ የሚያመጣበት አሉታዊ ጎንደር ለውጥ አይኖረውም

**6. አድራሻ**

ተሰፋዬ ታዩ  
ስልክ ቁጥር +251 913525746

**Annex II: Informed Consent form parent/garden (English and Amharic version)**

I the undersigned have been informed and understood that the purpose of this particular research project is to find out Prevalence of Intestinal Parasites in Diarrheal Children, parental KAP and Associated Risk Factors at Federal Police Hospital

I have been told that it is my full right not to participate, to discontinue or to participate in the study. If I do not like to participate, I am not obliged to answer the questionnaire. I have been

told that there will be no negative impact on whatever a decision I made. Hence, with this understanding, my honest participation will have contribution to generate information that can be used in the fight against intestinal parasites. I voluntarily consent that my child participates in this study provided he/she gives assent to give stool to give his/her stool.

Signature of the participants: \_\_\_\_\_

Date: \_\_\_\_\_

**የፈቃደኝነትነትመግለጫቅፅ**

እኔ ከዚህ በታች የፈረምኩት የአንጀት ጥገኛ ተህዋሲ ያስርጭት ሆዳቸውን ከሚያስቀምጣቸው እድሜያቸው ከ5 አመት በታች ህጻናት ርዕስ ለተዘጋጀው የጥናት አላማ ተነግሮኛል። በጥናቱ ላይ የመሳተፍ ምሆን ያለ መሳተፍ እንዲሁም በፈለኩ ጊዜ ቃለ መጠይቁን የማቋረጥ መብት እንዳለኝ ተነግሮኛል። የመሳተፍ ፍላጎት ከሌለኝ መጠይቁን የመመለስ ሰጣዬ ታየለብኝም። ማንኛውንም አይነት ወሳኔ በወስን ምንም አይነት ጉዳት እንደማይደርስ ብኝ ተነግሮኛል። ስለዚህ ያለውን ነገር ተረድቼ እኔ በሙሉ ፍቃደኝነት መሳተፌ የአንጀት ጥገኛ ተህዋሲ ያስርጭት ለማጥፋት መረጃ በመስጠት እንድሁም ህጻኑ የሰጠው ፍቃድ እንዲሰጠት የበኩሌን አስተዋጽኦ አደርጋለሁ።

የተሳታፊው ፊርማ \_\_\_\_\_

ቀን \_\_\_\_\_

### **Annex III: Questioner (English and Amharic version)**

#### **Socio demographic information of Study Participants**

Code participant-----

1. Sex of child

1. Male      2. Female

2. Age of the child \_\_\_\_\_

3. Education status of child      1.Non schooling 2. KG

Personal hygiene and environmental sanitation

4. Where is the source of drinking water?
    1. Tap water 2. Filter water 3. Tap water and Filter water
  5. is there Latrine: 1. Yes 2. No
  6. Do you wash your hands before and after meal? 1. Yes 2. No
  7. Are you washing fruit and vegetable before consumption? 1. Yes 2.No
  8. Do the child has diarrhea? 1. Yes 2. No
  9. Duration of diarrhea. 1. 1-5 days 2. 6-10 days 3. 11-15 days 4. >16 days
  10. Are you Brest feeding? 1. Yes 2.No
  11. Do child Animal contact? 1. Yes 2.No
  12. Have Child chronic disease? 1. Yes 2.No
  13. If the answer to question number 13 is yes, specify type of disease
- 

14. If the answer to question 22 is yes, how long you were diseased?

---

15. Income status of the family-----

16. How waste disposal? 1. Compound 2. Filed 3 .burning

17. Have you taken anti parasitic drugs in the last six days?

1. Yes 2.No

**የጥናቱ ተሳታፊ ማህበራዊ ግለሰብ መረጃ መጠይቅ**

**የህፃኑ/ኗ/ አሳዳጊ ወይም ተንከባካቤ የሚሟላ መጠይቅ**

የተሳታፊ ስድ-----

1. የህፃኑ/ኗ/ ስያ 1. ወንድ 2. ሴት
2. የህፃኑ/ኗ/ እድሜ -----
3. የህፃኑ/ኗ/ የትምህርት ደረጃ:- 1. ትምህርት ያልጀመረ 2. ኬጂ
4. የመጠጥ ወይም የትኩረት የምታገኙት? 1. የቧንቧ ወይም 2. የተጣራ ወይም (አይላንድ) 3. ከየጉድጓድ ወይም
5. መፀዳጃ ቤት አላቸው 1. አዎ 2. የለም
6. በፊት፣ ከምግብ በኋላ እና ከሽንት ቤት መልስ እጆቻቸውን ይታጠባሉ? 1. አዎ 2. አይ
7. አትክልትና ፍሬ ፊት ለፊት ለምትበጡት የጥብቃታል? 1. አዎ 2. አይ
8. ህፃኑ/ኗ/ ያስቀምጣቸዋል? 1. አዎ 2. አይ

9. ተራቁጥር 8 አዎከሆነመልስዎተቅማጡከጀመረስንትጊዜውነው? 1. 1-5 ቀን 2. ከ6-10 ቀን 3. 11-15 ቀን  
4. ከ16 ቀንበላይ
10. ህፃኑ/ኗ/ ጡትይጠባል? 1. አዎ 2. አይ
11. ህፃኑ/ኗ/ ከቤትእንስሳጋርግንጉነትአላቸውወይ? 1. አዎ 2. አይ
12. ህፃኑ/ኗ/ የታወቀለረጅምጊዜየቆየህመምአላቸው 1. አዎ 2. አይ
13. የተራቁጥር 12 መልሶአዎከሆነየህመሙንዳይነትይግለፁ?.....
14. የተራቁጥር 13 መልሶአዎከሆነህመሙከጀመረው/ራት/ ምንያህልጊዜነው? .....
15. የቤተሰብዎወርሃዊገቤስንትነው? .....
16. የቤትውስጥቆሻሻእንዴትነውየምታስወግዱት? 1. በሚዳላይ 2. በማቃጠል 3. ወደገንዳበመጣል
17. ላለፉትስድስት /6/ቀናትጥገኛተዋስመድሃኔትወሲዲል/ለች/ 1. አዎ 2. አይ

**Questioners about knowledge, attitude and practice (KAPs) of parents/guardians of children towards intestinal parasitic infection (English and Amharic version)**

**Questions designed to assess parents/guardians knowledge about intestinal parasitosis**

1. Have you ever heard about intestinal parasites? a. Yes b. No
2. How did you know about intestinal parasites?
  - a. Radio
  - b. Health facility
  - c. Friends
  - d. others (specify) -----
3. If yes to question No2, can you mention some of the intestinal parasites?
 

---
4. How is intestinal parasites transmitted?
  - a. Playing with soil
  - B .Dirty water
  - e.Eating contaminated food
  - c. Playing in infested river water
  - d. by flies
  - f. eating contaminated raw food
  - g. Don't know
5. What are the main signs and symptoms of intestinal parasites? (More than one response is

Possible)

- a. Fever
  - b. Headache
  - c. Weakness
  - d. Dry cough
  - e. Abdominal pain / discomfort
  - f. Diarrhea
  - g. Blood in stool
  - h. don't know
  - i. Others (specify)
6. Is intestinal parasites treatable? a. Yes b. No
7. Where do you prefer to seek treatment for intestinal parasites?
- a. Traditional healer
  - b. Health facility
  - c. Pharmacy (drug shop)
  - d. Others (specify)
8. Is intestinal parasite a preventable disease? a. Yes b. No
9. If yes to Q. 8, how do you prevent intestinal parasites?
- a. Treatment with specific medicines
  - b. Avoid bathing or swimming in stagnant water
  - c. Use of toilets
  - d. Provision of safe tap water
  - e. Avoid defecating in field
  - f. others (specify)

**Questions designed to assess parents/guardians attitude towards intestinal parasitosis**

1. Do you think intestinal parasitosis is a serious disease? a. Yes b. No
2. Do you think to take a medication against intestinal parasitosis is important?
- a. Yes
  - b. No
3. Do you think going to health facility is important when you feel abdominal discomfort?
- a. Yes
  - b. No
4. Do you think taking traditional medication is good to treat intestinal parasitosis?
- a. Yes
  - b. No
5. Do you think playing in soil can cause intestinal parasitosis?
- a. Yes
  - b. No
6. Do you think eating raw vegetables can cause intestinal parasitosis?
- a. Yes
  - b. No



**የህፃኑ/ኗ/ አሳዳጊዎችን ለማረጋገጥ፣ አመለካከት፣ ልምድ መረጃ መጠይቅ**

የጥናቱ ተሳታፊዎች ስለ አንጀት የሚጠቁት ላት ሎች በሽታ ያላቸውን እውቀት ለመገምገም የተዘጋጀ መጠይቅ

1. አንጀትን ስለ የሚጠቁት ላት ሎች ስም ተውያው ቃሉ? ሀ. አዎ ለ. አላቅም
2. አንጀትን ስለ የሚጠቁት ላት ሎች እንዴት ነው ያወቁት?  
ሀ. ሬድዮ ለ. ከጤና ተቋም  
ሐ. ከጓደኛ መ. ሌላ ካለ ይግለጹ
3. ለጥያቄ ጥር 1 መልስ ያስገኙ ለሆነ፣ የተወሰኑትን አንጀትን የሚጠቁት ላት ሎች መጠቀስ የችላሉ?

- 
4. አንጀትን የሚጠቁት ላት ሎች እንዴት ነው የሚተላለፈው?  
ሀ. በተበከለ ወንዝ ውሃ ውስጥ በመዋኘት ለ. የተበከለ ውሃ በመጠጣት  
ሐ. በተበከለ ወንዝ ውስጥ በመጫወት  
መ. በትንኝ ለ. በተበከለ ምግብ
  5. አንጀት የሚጠቃ በሽታ ዋና ዋና ልክቶች ምን ድንገቶች ናቸው? ( ከአንድ በላይ መልስ መስጠት ይቻላል)  
ሀ. ትኩረት ለ. ራስ ምታት

ሐ. ድካም መ. ደረቅሳል

ሰ. የሆድ ህመም ረ. ተቅማጥ

ሸ. በሰገራው ስጥ ደም መኖር ቀ. ኣላውቅም በ. ሌላካለይ ግለፁ

6 አንጀት ንጥሚያ ጠቁት ላት ሎች በሽታ ሊታከም ይችላል?

ሀ. አዎሊ. አይታከምም

7. አንጀት ንጥሚያ ጠቁ በሽታ መድ ሀኒት ከየት ቢያገኙ ነው የሚመርጡት?

ሀ. ከባህላዊ ህክምና ለ. ከጤና ተቋም

ሐ. ከመድ ሀኒት መደብር መ. ሌላካለይ ግለፁ

8. አንጀት ንጥሚያ ጠቁ በሽታ መከላከል ይቻላል? ሀ. አዎሊ. አይቻልም

9. ለጥያቄ ቁጥር 8. መልስ ለምሳሌ ሆነ አንጀት ንጥሚያ ጠቁ በሽታ እንዴት ነው የሚከላከሉት?

ሀ. መድ ሀኒት በመውሰድ ለ. በተበከለ የወንዝው ሀውስ ጥላላ መታጠብ/አለመዋኘት

ሐ. መፀዳጃ ሴት መጠቀም መ. ንፁህ ገንቢው ሃ በመጠቀም

ሰ. ወንዝ ዳር አለ መፀዳጃ ትረ. ሌላካለይ ግለፁ ሠ. ኣላውቅም

የጥናቱ ተሳታፊዎች ስለ አንጀት የሚጠቁት ላት ሎች በሽታ ያላቸው ንስሐ ለካከት ለመገምገም የተዘጋጀ መጠይቅ

1. አንጀት ንጥሚያ ጠቁት ላት ሎች በሽታ አደገኛ በሽታ ነው ብለው ያምናሉ? ሀ. አዎሊ. አላምንም

2. አንጀት ንጥሚያ ጠቁት ላት ሎች በሽታ መድ ሀኒት መውሰድ አስፈላጊ ነው ብለው ያምናሉ?

ሀ. አዎሊ. አላምንም

3. ሆድ ስያም ዎት ወደ ጤና ተቋም መሄድ አስፈላጊ ነው ብለው ያምናሉ?

ሀ. አዎሊ. አላምንም

4. አንጀት ንጥሚያ ጠቁት ላት ሎች በሽታ የባህል መድ ሀኒት መውሰድ ጥሩ ነው ብለው ያምናሉ?

ሀ. አዎሊ. አላምንም

5. አፈር ላይ መጫወት አንጀት ንጥሚያ ጠቁት ላት ሎች በሽታ ያስከትላል ብለው ያምናሉ?

ሀ. አዎሊ. አላምንም

6. ያልበሰሉ አትክልቶች መብላት አንጀት ንጥሚያ ጠቁት ላት ሎች በሽታ ያስከትላል ብለው ያምናሉ?

ሀ. አዎሊ. አላምንም

የጥናቱ ተሳታፊዎች አንጀት የሚጠቁት ላት ሎች በሽታ ያላቸው ንጋሪ ለመገምገም የተዘጋጀ መጠይቅ

1. ህፃኑ/ኗ/ጥሬ ሰጋ/ አትክልቶች ይበላሉ? ሀ. አዎሊ. አልበላም



### **Procedure of wet mount**

1. Place one drop of 0.85% NaCl on the left side of the slide and one drop of iodine (working solution) on the right side of the slide.
2. Take a small amount of fecal specimen and thoroughly emulsify the stool in saline and iodine using an applicator stick. The sample should be spread thinly enough that newsprint can barely be read when the slide is placed on top of text.
3. Slide a 22mm cover slip at an angle into the edge of the emulsified fecal drop. Push the cover slip across the drop before allowing it to fall into place.
4. Systematically scan the entire 22mm cover slip with overlapping fields with the 10x objective.
5. Switch to high dry (40X objective) for more detailed study of any suspect eggs or protozoa.

### **Formalin-ether sedimentation concentration**

#### **Procedure**

1. Mix about 1 g of faeces (size of a hazelnut) with 10 mL of fixative (SAF or Formalin 5–10%), and leave for at least 30 minutes.
2. Strain the suspension into a 15 ml conical tube through a sieve or double layer Of gauze allocated into a small funnel and centrifuge at 500 g for 10 minutes.
3. Remove the supernatant and break the sediment with a wooden toothpick.
4. Add 7 mL of saline to the sediment; seal the tube with a stopper and mix.
5. Add 3 mL of ether (Caution: these reagents should be handled with special care as they are very volatile and may cause explode), seal the tube with a rubber stopper (check that it is tightly closed) and shake vigorously for 30 seconds.
6. Wait 15–30 seconds and carefully remove the stopper.
7. Centrifuge at 500 g for 3 minutes.
8. The contents in the tube will separate in four layers, starting from the bottom: Sediment (containing the parasitic elements), saline, plug of faecal debris, and top layer of ether.
9. Detach the plug of debris from the tube wall with the help of an applicator stick. Pour off the top three layers by inverting the tube with a brisk movement.
10. Mix the sediment with the remaining liquid (if needed, add a few drops of saline).
11. Place a drop of the sediment on a slide and cover with a coverslip. A Lugolstained
12. Examine using a microscope.

### **Modified Ziehl–Neelsen technique (acid-fast stain)hot method**

Used For detection of *Cryptosporidium* Cyclospora and other coccidian infections.

#### Procedure

1. Make a thin stool smear on a clear and dry slide. Allow to dry
2. Fix with absolute methanol for 30 seconds. Allow to dry.
3. Stain the slide with carbol fuchsin for 15-20 minutes.
4. Rinse for 1 minutes with 1% acid alcohol
5. Rinse in tap water
6. Stain with methylene blue for 1 minute. Rinse, allow drying and examining using oil immersion.

#### Quality Control

- ✓ A control slide of *Cryptosporidium* spp, cyst and trophozoite of ameba or giardia from a 10% formalin preserved specimen should be included with each staining run.
- ✓ Check all reagents each time they are used and ensure that formalin and saline appear clear without any visible contamination.
- ✓ Ensure that all reagents and chemicals have not expired.

#### Declaration

I, the under signed, declare that this MSc thesis is my original work and it has not been presented for a degree in any other University. All sources of materials used for this thesis and institutions who gave support have been duly acknowledged.

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